

OPERATION METHOD OF PORTABLE PHONE TO CHANGE MODE
USING DIAL KEY AND APPARATUS FOR THE SAME

Background of the Invention

5 1. Field of the Invention

The present invention relates to an operation method and an operation apparatus of a portable phone, and more particularly to an operation method to change an operation mode by use of a dial key and an operation apparatus of a portable phone for the same.

2. Description of the Related Art

A small size portable phone has housing formed in a small size. In such a small size portable phone, a key is small and a pitch between the keys is narrow. Moreover, when multiple functions will be further achieved, it is more difficult to arrange a large number of keys which will increase in accordance to the number of functions.

As for the function with a high use frequency such as a telephone number searching operation, the operation needs to be simplified to make it easy for a user to use the function. However, the multiple functions require the user a complicated operation, even if the functions have high use frequencies. Therefore, another

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input unit such as a function key is often necessary in addition to dial keys.

When the user uses the telephone number searching function with the high use frequency, it is desired not to increase the number of keys. Also, it is desired that the key operation is simple.

In conjunction with the above description, a telephone is disclosed in Japanese Laid Open Patent Application (JP-A-Heisei 8-181760). In this reference, a received signal by an antenna (1) is supplied to a modulating/demodulating section (3) via a radio section (2) and demodulated there. Then, a compressed speech data is separated from the demodulated signal by a TDMA processing section (4) and decoded by a speech codec section (6) so that a received speech signal is supplied to a speaker (7). A transmission speech signal is coded by the speech codec section (6) and then subjected to a multiplexing process in the TDMA processing section (4). Further, after a modulating process by the modulating/demodulating section (3), the multiplexed signal is transmitted from the antenna (1) via the radio section (2). A memory (13) stores a telephone directory data. A telephone directory data searching key of a key

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input section (11) such as an up key and a down key which are different from dialing numeral keys. At this time, an operation mode is changed from a wait mode to a telephone directory mode so that a first portion of the telephone directory data is displayed on a display section (16). Each time the searching key is operated, a next portion of the telephone directory data is displayed on the display section (16).

Also, a portable phone is disclosed in Japanese Laid Open Patent Application (JP-A-Heisei 9-261744). In this reference, a portable phone has a redialing function and a telephone directory function. A volume adjusting key (54) is provided on a side surface of a main body (40). The key (54) is used to adjust the volume when a currently received speech is outputted. The key (54) is used as a replay volume in case of speech replay. The volume adjusting key (54) functions as an adjusting key of a call arrival volume (call originating volume) within a predetermined time after a function key (43) is operated. When the key (54) is operated in the other states, an operation mode is changed to a search mode so that it is possible to search a redial data and a telephone directory data by use of the key (54).

Also, a portable phone is disclosed in

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Japanese Laid Open Patent Application (JP-A-
Heisei 9-186760). In this reference, scroll keys
are provided. When a telephone directory data is
searched, one of katakana characters is specific
5 and names are displayed from a specific name
having the specific character as the head
character. The specific character is changed by
use of the scroll keys.

Also, a portable phone is disclosed in
10 Japanese Laid Open Patent Application (JP-A-
Heisei 10-190812). In this reference, a data
containing a communication destination name and a
telephone number is stored. All the stored data
are classified into groups by dividing the stored
15 data for every predetermined number in a storage
order, or based on which line of hirakana sounds
does the sound of the head character of the name
belong to. An operation key is provided to be
possible to operate to one of 8 directions of up
20 and down directions, left and right directions
and diagonal directions. The data in one group
are searched in order through the operation of
the key to the up or down direction and the group
is changed through the operation of the key to
25 the other direction.

Summary of the Invention

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Therefore, an object of the present invention is to provide an operation method and operation apparatus of a portable phone in which the number of keys is not increased for a
5 function.

Another object of the present invention is to provide an operation method and operation apparatus of a portable phone in which the number of keys is not increased for a function and a key
10 operation is simple.

In order to achieve an aspect of the present invention, an operation method of a portable phone includes: operating any one of dial keys in a call originating mode; determining
15 whether the operated dial key is one of unspecific dial keys of the dial keys other than at least one specific dial key; and changing an operation mode from the call originating mode to one of non-dialing operation modes when the
20 operated dial key is one of the unspecific dial keys.

Here, the non-dialing operation mode may be a telephone number searching operation mode.

Also, the operation method may further
25 include: executing a non-dialing operation other than a dialing operation in the non-dialing operation mode when the operated dial key is one

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of the unspecific dial keys. In this case, the non-dialing operation may be a telephone number searching operation.

5 The specific dial key may be one selected from "0", "1" and "#", or only one which is predetermined. In this case, the non-dialing operation may be a telephone number search operation.

10 Also, the number of the unspecific dial keys may be at least two, and the executing a non-dialing operation includes: displaying a list of data associated with destination phone numbers. In this case, the operation method may further include: selectively scrolling the list of data
15 in one of upward and downward directions in response to an operation of one of the unspecific dial keys.

20 In order to achieve another aspect of the present invention, a portable phone includes dial keys including at least one specific key and unspecific keys, and a processing unit. The processing unit determines whether one of the dial keys which is operated in a first mode is one of the unspecific dial keys, and changes an
25 operation mode from the first mode to a second mode when the operated dial key is one of the unspecific dial keys.

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Here, the first mode may be call
originating mode and the second mode may be a
telephone number searching operation mode.

Also, the processing unit may further
5 execute a non-dialing operation other than a
dialing operation when the operated dial key is
one of the unspecific dial keys. In this case,
the first mode may be call originating mode and
the second mode may be a telephone number
10 searching operation mode.

At least one specific dial key may be one
selected from "0", "1" and "#", or may be only
one which is predetermined. The non-dialing
operation may be a telephone number search
15 operation.

Also, the number of the unspecific dial
keys may be at least two. When the portable phone
further includes a display unit, the processing
unit controls the display unit to display a list
20 of data associated with destination phone numbers
as a non-dialing operation, and controls the
display unit to selectively scroll the list of
data in one of upward and downward directions in
response to an operation of one of the unspecific
25 dial keys. In this case, a symbol indicating the
scrolling direction is allocated to each of the
unspecific dial keys.

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Also, the number of the unspecific dial keys may be at least four. The processing unit changes the operation mode from the second mode to another mode in response to an operation of
5 one of the unspecific dial keys. In this case, each of the unspecific dial keys has a shape indicating the scrolling direction.

Brief Description of the Drawings

10 Fig. 1 is a circuit block diagram showing a portable phone according to a first embodiment of the present invention;

Fig. 2 is a plan view showing the portable phone according to the first embodiment of the
15 present invention;

Fig. 3 is a flow chart showing the operation of the portable phone according to the first embodiment of the present invention;

Fig. 4A is a plan view of an operating
20 state of the portable phone according to the first embodiment of the present invention, and Fig. 4B is a plan view of a display screen showing another operating state the portable phone according to the first embodiment of the
25 present invention;

Figs. 5A to 5C are plan views showing other operating states of the portable phone according

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to the first embodiment of the present invention;

Fig. 6 is a plan view shows an operation unit of the portable phone according to a second embodiment of the present invention; and

5 Fig. 7 is a circuit block diagram showing the portable phone according to a third embodiment of the present invention.

Description of the Preferred Embodiments

10 Hereinafter, a portable phone of the present invention will be described below in detail with reference to the attached drawings.

Fig. 1 shows a circuit block diagram showing a portable phone according to the first
15 embodiment of the present invention. Referring to Fig. 1, the portable phone 1 in the first embodiment is composed of dial keys 2, a processing unit 3, a storage unit 4 and a display unit 5. The dial keys 2 are used to manually
20 input digits and to change an operation mode. A signal corresponding to the dial key 2 is supplied to the processing unit 3. The processing unit 3 operates in accordance with a program which is stored in a memory (not shown), and is
25 connected with the storage unit 4 and the display unit 5. A user stores sets of a destination name and a telephone number for the name in the

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storage unit 4. The processing unit 3 controls the display unit 5 to display a list of destination names in accordance with the input signal given from the dial key 2.

5 In the first embodiment, the dial key 2 of "2" and the dial key 2 of "5" are used for a telephone number searching operation. An upward arrow "↑" is attached to the dial key 2 of "2" and a downward arrow "↓" is attached to the dial
10 key 2 of "5", as shown in Fig. 2. Thus, the user can easily recognize that the dial key 2 of "2" and the dial key 2 of "5" are used for the telephone number searching operation. It is desirable that the dial key 2 of "2" and the dial
15 key 2 of "5" are formed in special shapes such as a triangle, so that the dial key 2 of "2" and the dial key 2 of "5" can be visually and easily distinguished from the other dial keys 2 by the user.

20 Next, referring to Fig. 3, an operation method of the portable phone according to the first embodiment of the present invention will be described. Here, it is supposed that the portable phone is in a dialing operation mode.

25 First, it is determined whether the head of a character string or digit string 5-1 inputted through the key operation of the dial keys 2 is

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"0", "1" or "#" (step S1). In many portable phones, a special digit is first entered for a long-distance call. Generally, the special digit is "0", "1" or "#". If the head of the character string or digit string 5-1 inputted through the key operation is "0", "1" or "#" (Yes at the step S1), the character string or digit string 5-1 is fully displayed on the display unit 5 (Step S5). Fig. 4A shows "02012345678" as an example of such digit string 5-1. Fig. 4B shows "#1234" as another example.

When the head of the digit string 5-1 is not "0", "1" or "#" (No at the step S1), it is determined whether the head of the digit string 5-1 is "2" or "5" (Step S2). If the head of the digit string 5-1 is not "2" or "5", the control returns to the step S1.

When the head of the digit string 5-1 is "2" or "5" (Yes at the step S2), the processing unit 3 automatically changes the operation mode from the dialing operation mode to a telephone number searching operation mode. In this way, the processing unit 3 carries out a telephone number searching operation. That is, the processing unit 3 reads out the sets of a name and a telephone number from the storage unit 4. Then, the processing unit 3 controls the display unit 5 to

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display a list of sets of the name and the telephone number in the order of "a-i-u-e-o" or alphabet, as shown in Fig. 5A (Step S3). Here, it is supposed that the head and end of the list are
5 linked.

Next, it is determined whether the following operated dial key 2 is the key "2↑" or key "5↓" (Step S5). When the key "2↑" or key "5↓" is not operated (Yes at the step S5), the
10 control is ended.

When the key "2↑" or key "5↓" is operated (No at the step S5), the control advances to a step S6. In this case, when the key "2↑" is operated, the processing unit 3 controls the
15 display unit 5 to scroll the list by one line in the upward direction and to display the scrolled list, as shown in Fig. 5B. Also, when the key "5↓" is operated, the processing unit 3 controls the display unit 5 to scroll the list by one line
20 in the downward direction and to display the scrolled list, as shown in Fig. 5C (Step S6). Thus, the list is scrolled to search a destination telephone number. Thereafter, the control returns to the step S5.

25 In the above mentioned illustration, the key of "2" and the key of "5" are selected as unspecific dial keys. Also, the keys of "0", "1"

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and "#" are selected as specific dial keys.
However, if the key of "2" or the key of "5" is
not first used to input the telephone number in
the dialing operation, the operation mode is not
5 changed and any function may be allocated.

Fig. 6 shows the portable phone according
to the second embodiment of the present invention.
Referring to Fig. 6, the dial keys of "2", "4",
"5", "6", and "8" are unspecific keys. When the
10 dial key of "5/AG" is first operated as the head
of the digit string, the operation mode may be
changed from the dialing operation mode to the
telephone number searching operation mode. When
the dial keys of "2", "4", "6", or "8" is first
15 operated, the operation mode may be changed to
another operation mode.

In the telephone number searching operation
mode, the telephone number records are displayed.
When the dial key of "2↑", "4←", "6→", or "8↓"
20 is operated, the searching operation of a target
telephone number is carried out.

Fig. 7 shows the portable phone according
to the third embodiment of the present invention.
The portable phone 1' contains a recording medium
25 6 which stores a program for the telephone number
searching operation. The semiconductor memory is
an optimal for the portable phone as the

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recording medium 6. The processing unit 3' reads the program from the recording medium 6, and operates the program. The processing unit 3' executes the same processing as that of the
5 processing unit 3 of Fig. 1.

According to the operation method and portable phone of the present invention, the retrieval of a telephone number is made quickly possible through only the operation of a dial key.
10 Therefore, any key of exclusive use for the searching operation can be made unnecessary to be provided in addition to the dial keys and the number of parts can be reduced.

Also, according to the present invention,
15 the operation mode can be changed using the dial key. Therefore, a function can be added without addition of a function key.

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